This print-out should have 5 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 10.0 points

Find all nonzero values of k for which the function $y = A \sin kt + B \cos kt$ satisfies the differential equation

$$y'' + 9y = 0$$

for all values of A and B.

1. $k = -9$

2. $k = 3$

3. $k = 9$

4. $k = -3$

5. $k = 3, -3$

6. $k = 9, -9$

002 10.0 points

The family of solutions to the differential equation $y' = -10xy$ is $y = Ce^{-5x^2}$.

Find the solution that satisfies the initial condition $y(0) = 1$.

1. $y = e^{5x^2}$

2. $y = e^{-5x^2} + 1$

3. $y = e^{-5(x^2+1)}$

4. $y = e^{-5x^2}$

5. $y = e^{-5(x+1)^2}$

003 10.0 points

Which of the following answers lists all constant solutions to the equation

$$\frac{dy}{dt} = y^4 - 5y^3 + 6y^2 \,?$$

1. $y = -5, 6$

2. $y = 2, 3$

3. $y = -5, 0, 6$

4. $y = 0, 2, 3$

5. $y = 0$

004 10.0 points

Find all values of r for which the function $y = e^{rt}$ satisfies the differential equation

$$y'' - 4y' - 12y = 0.$$

1. $r = -2, 6$

2. $r = -2$

3. $r = 12$

4. $r = -6, 2$

5. $r = -12, -4$

6. $r = 4, 12$

005 10.0 points

Find all values of k that don't result in a zero function for which the function $y = \sin kt$ satisfies the differential equation

$$y'' + 36y = 0$$

1. $k = -36$

2. $k = 6, -6$

3. $k = -6$

4. $k = 6$

5. $k = 36$

6. $k = 36, \ -36$